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Two hundred and eight first graders were assigned to one of three treatment groups. Treatment A received initial instruction in letter names followed by sight words; treatment B received initial instruction in letter names and sounds followed by sight words; and treatment C received initial instruction in sight words followed by letter names and sounds. The time spent and the materials used in reading instruction outside the experimental situation were held constant for all three treatment groups. Pretesting measures included the Murphy-Durrell Reading Readiness Analysis, subtests of the Metropolitan Readiness Test, and the Lorge-Thorndike Intelligence Tests, Level I, Form B, Primary. Post-testing after 18 weeks included the word knowledge, word discrimination, and reading subtests of the Metropolitan Achievement Test, Form C, Primary I Battery. Statistically significant differences favored treatment group B over both treatments A and C in word knowledge and word discrimination. Differences were significant in favor of both B and C over A in comprehension, but no significant differences were found between B and C. Children of below-average readiness benefited in treatment A in word perception only, while children of average readiness benefited most from treatment B for all three criteria. Tables are included. (CM)

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THE EFFECTS OF LETTER KNOWLEDGE ON ACHIEVEMENT IN READING IN THE FIRST GRADE*

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Purpose of the Study

It was the purpose of this study to determine the effects of initial instruction in letter names, initial instruction in letter names and sounds, and initial instruction in sight words on achievement in first grade reading. The null hypotheses tested in this study were:

There are no significant differences among groups in the effects produced by the selective ordering of initial instruction in letter names, letter names and sounds, and sight words on achievement on tests of word knowledge, word discrimination, and comprehension (1) for subjects in three treatment groups within the total sample, (2) for sub-group samples of subjects representing three levels of intelligence, and (3) for sub-group samples of subjects representing three levels of reading readiness.

RE 001 718

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The Sample

The sample was composed of 208 first grade boys and girls who were distributed among three schools in Columbia, Missouri. Treatment Group A was composed of 28 boys and 32 girls; Treatment Group B of 39 boys and 41 girls; Treatment Group C of 39 boys and 29 girls. Each treatment group was composed of students in three first grade classrooms in each school--one classroom for children classified as having high reading readiness status, one classroom for children classified as having average reading readiness status, and one classroom for children classified as having low reading readiness status. The sample did not include first grade children who had not attended kindergarten, children who were foreign-language oriented, or children who entered school after initiation of experimental treatments.

Pre-Test Procedures

Pre-tests included tests of letter knowledge possessed by students prior to entrance in first grade as measured the second week of the school term by means of the phonemes test and letter names test included in the Murphy-Durrell Reading Readiness Analysis. Further testing of letter knowledge was carried on by means of specially constructed individual tests of letter names and sounds. The first three sub-tests of the Metropolitan Readiness Test were administered during the third week of the school term to measure information and oral language comprehension of words and sentences. Deviation intelligence quotients of students in the sample were established by means of the Lorge-Thorndike Intelligence Tests, Level I, Form B, Primary Battery.

Instructional Procedures

Instruction in experimental variables began the second week of the school term for all treatment groups. Treatment Group A received initial instruction in letter names followed by instruction in sight words. These lessons included activities in distinguishing letter forms from one another, finding specific letters in words, matching letters, associating upper-case and lower-case letters, checking ability to identify letter names and to name letters shown.

Treatment Group B received initial instruction in letter names and sounds followed by sight words. These lessons included activities in distinguishing letter forms from one another, listening for beginning sounds in words, associating letter sounds and forms, and matching beginning sounds and letters.

Treatment Group C received initial instruction in sight words followed by the teaching of letter names and sounds. Lessons involved activities in visual and auditory perception of whole words, configuration clues, whole words in sentences, relation of oral expression to written expression, and activities in matching like words and noting details in words without reference to letter names or sounds. Some lessons were designed to reinforce knowledge of sight words and associate sight words with meaning in different contexts.

The time spent in reading instruction and the materials used during instructional time not devoted to the experimental variable were held constant for each of the three treatment groups. All treatment groups used the same basal materials for reading instruction during instructional time not devoted to the experimental variable.

Measurement of the criterion variables (word knowledge, word discrimination, and comprehension) was accomplished at the end of the eighteenth week of the term by means of the Metropolitan Achievement Test, Primary I Battery, Form C. The first sub-test, Word Knowledge, was utilized to measure the examinee's sight vocabulary or word recognition ability. The sub-test, Word Discrimination, was utilized to measure the ability to associate letter and word symbols with sounds. With the third sub-test, Reading, ability to comprehend sentences and paragraphs was evaluated.

Findings

An analysis of covariance technique was used to test the three major hypotheses. Statistically controlled variables were prior knowledge of letter names, prior knowledge of letter sounds, information and oral language comprehension, and intelligence.

When the analysis of covariance resulted in the rejection of a null hypothesis, Scheffe's Method for Multiple Comparisons was utilized. The .05 level of significance was accepted as criterion for the rejection of the null hypothesis.

The first hypothesis tested related to the significant differences between means in word knowledge, word discrimination, and comprehension for the three treatment groups within the total sample. On Tables I, II, and III are shown the differences among the adjusted means for the three treatment groups within the total sample. Statistically significant differences in achievement in word knowledge and word discrimination favored Treatment Group B over both Treatment Groups A and C. There were no significant differences between Treatment Groups A and C in achievement in

word knowledge or in word discrimination. No significant differences existed between Treatment Groups B and C in achievement in comprehension. Differences were significant in favor of both Treatment Groups B and C over Treatment Group A in achievement in comprehension.

The second hypothesis tested related to the significant differences between means on the three criterion measures for children on three intelligence levels. On Tables IV, V, and VI are shown the differences among the adjusted means for sub-group samples of children with intelligence quotients from 120 to 130. Significant differences in achievement in all three criterion measures favored Treatment Group B over Treatment Group A. The differences failed to meet the criterion of significance in achievement in either criterion measure between Treatment Groups B and C or between Treatment Groups A and C.

On Tables VII, VIII, and IX are shown the findings for sub-group samples of children with intelligence quotients from 98 to 119. Significant differences in achievement in word knowledge and word discrimination favored Treatment Group B over both Treatment Groups A and C. There were no statistically significant differences between Treatment Groups A and C in achievement in word knowledge or word discrimination. Significant differences favored Treatment Group B over Treatment Group A in achievement in comprehension, but no significant differences existed between Treatment Groups B and C or between Treatment Groups A and C in achievement in comprehension.

Since no differences between treatment groups met the criterion of statistical significance at the .05 level of confidence in either of the criterion measures for sub-group samples

of children with intelligence quotients from 79 to 97, Scheffe's test was not employed.

The third major hypothesis to be tested concerned the significant differences between means in word knowledge, word discrimination, and comprehension for sub-group samples of children on three reading readiness levels. On Tables X, XI, and XII are shown the differences among the adjusted means for sub-group samples of children with above-average reading readiness. Significant differences in achievement on all three criterion measures favored Treatment Groups B and C over Treatment Group A. No significant differences existed between Treatment Groups B and C on tests of achievement in either of the criterion measures.

On Tables XIII, XIV, and XV are shown the findings related to the sub-group sample of children with average reading readiness. Significant differences favored Treatment Group B over both Treatment Groups A and C in achievement on tests of word knowledge, word discrimination, and comprehension.

On Tables XVI and XVII are shown the findings relative to sub-group samples of children with below-average reading readiness. Differences of significance favored Treatment Group A over both Treatment Groups B and C, and Treatment Group B over Treatment Group C in achievement on tests of word knowledge. Significant differences in achievement on tests of word discrimination favored Treatment Groups A and B over Treatment Group C, but differences between Treatment Groups A and B failed to meet the criterion of significance. No significant differences existed among treatment groups in achievement on tests of comprehension, so Scheffe's test was not employed.

Conclusions

Based on the findings of this investigation and within its limitations, certain conclusions may be drawn about the reading achievement of children in February of the first grade. These conclusions are the following:

1. Initial instruction in letter names and sounds produces greater achievement in word perception than does initial instruction in either letter names or sight words. However, when comprehension becomes the criterion of achievement, there is little difference between the value of letter names and sounds and sight words in the effects produced by their teaching.
2. For children with intelligence quotients between 90 and 119 initial instruction in letter names and sounds produces higher achievement in word perception, but not in comprehension, than does instruction in sight words. However, on no other intelligence levels were any differences of significance apparent in the effects produced by instruction in letter names and sounds or sight words on any of the three measures of reading achievement.
3. Initial instruction in letter names and sounds appears to be an aid in reading achievement chiefly for those children who are average on measures of reading readiness.
4. Initial instruction in letter names appears to be of value to reading achievement mainly for children below average on measures of reading readiness and then only in word perception.

Implications of the Findings for Education

The findings in this investigation have certain implications for instruction in beginning reading. First of all, letter names and sounds seem to have a significant advantage in producing achievement in word knowledge and in word discrimination, but not in producing achievement in comprehension. If word perception is to be the primary goal of beginning reading instruction, it would seem that early emphasis in instruction should be on letter names and sounds. If, however, comprehension is the primary goal, there would appear to be little merit in a concentrated program of instruction in letter names and sounds apart from instruction in sight words.

Secondly, instruction in letter names alone seems to have little effect on achievement in beginning reading except for children who are below average in reading readiness. Even for those children, however, initial instruction in letter names produces no significant effect on achievement in comprehension. It might appear, therefore, that time might be more economically utilized on other procedures that make a greater contribution to achievement of goals in beginning reading. If the contribution of an emphasis on symbols is the development of attention and persistence and the development of ability to follow directions, there might be other factors in instruction which could produce the same results and also contribute more significantly to reading development.

TABLE I

ADJUSTED MEANS AND MEAN DIFFERENCES FOR THREE TREATMENT GROUPS ON WORD KNOWLEDGE

	$\bar{x}_j$	$\bar{x}_j - \bar{x}_A$	$\bar{x}_j - \bar{x}_C$
$\bar{x}_B$	25.6241	2.8500	2.6956
$\bar{x}_C$	22.9285	.1629	
$\bar{x}_A$	22.7656		

TABLE II

ADJUSTED MEANS AND MEAN DIFFERENCES FOR THREE TREATMENT GROUPS ON WORD DISCRIMINATION

	$\bar{x}_j$	$\bar{x}_j - \bar{x}_A$	$\bar{x}_j - \bar{x}_C$
$\bar{x}_B$	26.1688	3.9738	2.8927
$\bar{x}_C$	23.2762	1.0811	
$\bar{x}_A$	22.1951		

TABLE III

ADJUSTED MEANS AND MEAN DIFFERENCES FOR THREE TREATMENT GROUPS ON READING (COMPREHENSION)

	$\bar{x}_j$	$\bar{x}_j - \bar{x}_A$	$\bar{x}_j - \bar{x}_C$
$\bar{x}_B$	23.9547	5.8798	1.9381
$\bar{x}_C$	22.0166	3.9417	
$\bar{x}_A$	18.0749		

TABLE IV

ADJUSTED MEANS AND MEAN DIFFERENCES ON WORD KNOWLEDGE FOR THREE TREATMENT GROUPS OF CHILDREN WITH INTELLIGENCE QUOTIENTS FROM 120 TO 130

	$\bar{x}_j$	$\bar{x}_j - \bar{x}_A$	$\bar{x}_j - \bar{x}_C$
$\bar{x}_B$	29.4105	3.7795	1.8065
$\bar{x}_C$	27.604	1.973	
$\bar{x}_A$	25.631		

TABLE V

ADJUSTED MEANS AND MEAN DIFFERENCES ON WORD DISCRIMINATION FOR THREE TREATMENT GROUPS OF CHILDREN WITH INTELLIGENCE QUOTIENTS FROM 120 TO 130

	$\bar{x}_j$	$\bar{x}_j - \bar{x}_A$	$\bar{x}_j - \bar{x}_C$
$\bar{x}_B$	28.8970	4.7706	.8714
$\bar{x}_C$	28.0256	3.8992	
$\bar{x}_A$	24.1264		

TABLE VI

ADJUSTED MEANS AND MEAN DIFFERENCES ON READING (COMPREHENSION) FOR THREE TREATMENT GROUPS OF CHILDREN WITH INTELLIGENCE QUOTIENTS FROM 120 TO 130

	$\bar{x}_j$	$\bar{x}_j - \bar{x}_A$	$\bar{x}_j - \bar{x}_C$
$\bar{x}_B$	27.9941	6.7261	1.5679
$\bar{x}_C$	26.4262	5.1582	
$\bar{x}_A$	21.268		

TABLE VII

ADJUSTED MEANS AND MEAN DIFFERENCES ON WORD KNOWLEDGE FOR THREE TREATMENT GROUPS OF CHILDREN WITH INTELLIGENCE QUOTIENTS FROM 98 TO 119

	$\bar{x}_j$	$\bar{x}_j - \bar{x}_C$	$\bar{x}_j - \bar{x}_A$
$\bar{x}_B$	25.4338	3.6581	2.9526
$\bar{x}_A$	22.4812	.7055	
$\bar{x}_C$	21.7757		

TABLE VIII

ADJUSTED MEANS AND MEAN DIFFERENCES ON WORD DISCRIMINATION FOR THREE TREATMENT GROUPS OF CHILDREN WITH INTELLIGENCE QUOTIENTS FROM 98 TO 119

	$\bar{x}_j$	$\bar{x}_j - \bar{x}_C$	$\bar{x}_j - \bar{x}_A$
$\bar{x}_B$	26.4303	4.1143	4.0881
$\bar{x}_A$	22.3422	.0262	
$\bar{x}_C$	22.316		

TABLE IX

ADJUSTED MEANS AND MEAN DIFFERENCES ON READING (COMPREHENSION) FOR THREE TREATMENT GROUPS OF CHILDREN WITH INTELLIGENCE QUOTIENTS FROM 98 TO 119

	$\bar{x}_j$	$\bar{x}_j - \bar{x}_A$	$\bar{x}_j - \bar{x}_C$
$\bar{x}_B$	23.4282	5.5847	2.3948
$\bar{x}_C$	21.0334	3.1899	
$\bar{x}_A$	17.8435		

TABLE X

ADJUSTED MEANS AND MEAN DIFFERENCES ON WORD KNOWLEDGE FOR THREE TREATMENT GROUPS OF CHILDREN WITH AN ABOVE-AVERAGE READING READINESS STATUS

	$\bar{x}_j$	$\bar{x}_j - \bar{x}_A$	$\bar{x}_j - \bar{x}_C$
$\bar{x}_B$	29.5362	4.982	.9436
$\bar{x}_C$	28.5926	4.0384	
$\bar{x}_A$	24.5542		

TABLE XI

ADJUSTED MEANS AND MEAN DIFFERENCES ON WORD DISCRIMINATION FOR THREE TREATMENT GROUPS OF CHILDREN WITH AN ABOVE-AVERAGE READING READINESS STATUS

	$\bar{x}_j$	$\bar{x}_j - \bar{x}_A$	$\bar{x}_j - \bar{x}_C$
$\bar{x}_B$	30.2671	5.2925	1.5819
$\bar{x}_C$	28.6852	3.7106	
$\bar{x}_A$	24.9746		

TABLE XII

ADJUSTED MEANS AND MEAN DIFFERENCES ON READING (COMPREHENSION) FOR THREE TREATMENT GROUPS OF CHILDREN WITH AN ABOVE-AVERAGE READING READINESS STATUS

	$\bar{x}_j$	$\bar{x}_j - \bar{x}_A$	$\bar{x}_j - \bar{x}_B$
$\bar{x}_C$	28.6152	8.4937	1.0946
$\bar{x}_B$	27.5206	7.3991	
$\bar{x}_A$	20.1215		

TABLE XIII

ADJUSTED MEANS AND MEAN DIFFERENCES ON WORD KNOWLEDGE FOR THREE TREATMENT GROUPS OF CHILDREN WITH AN AVERAGE READING READINESS STATUS

	$\bar{x}_j$	$\bar{x}_j - \bar{x}_C$	$\bar{x}_j - \bar{x}_A$
$\bar{x}_B$	28.0655	4.8340	4.2517
$\bar{x}_A$	23.8138	.5832	
$\bar{x}_C$	23.2306		

TABLE XIV

ADJUSTED MEANS AND MEAN DIFFERENCES ON WORD DISCRIMINATION FOR THREE TREATMENT GROUPS OF CHILDREN WITH AN AVERAGE READING READINESS STATUS

	$\bar{x}_j$	$\bar{x}_j - \bar{x}_A$	$\bar{x}_j - \bar{x}_C$
$\bar{x}_B$	27.6309	6.1116	4.0656
$\bar{x}_C$	23.5653	2.046	
$\bar{x}_A$	21.5193		

TABLE XV

ADJUSTED MEANS AND MEAN DIFFERENCES ON READING (COMPREHENSION) FOR THREE TREATMENT GROUPS OF CHILDREN WITH AN AVERAGE READING READINESS STATUS

	$\bar{x}_j$	$\bar{x}_j - \bar{x}_A$	$\bar{x}_j - \bar{x}_C$
$\bar{x}_B$	25.2095	7.136	4.818
$\bar{x}_C$	20.3915	2.318	
$\bar{x}_A$	18.0735		

TABLE XVI

ADJUSTED MEANS AND MEAN DIFFERENCES ON WORD KNOWLEDGE FOR THREE TREATMENT GROUPS OF CHILDREN WITH A BELOW-AVERAGE READING READINESS STATUS

	$\bar{x}_j$	$\bar{x}_j - \bar{x}_C$	$\bar{x}_j - \bar{x}_B$
$\bar{x}_A$	19.2061	8.4957	3.7192
$\bar{x}_B$	15.4869	4.7765	
$\bar{x}_C$	10.7104		

TABLE XVII

ADJUSTED MEANS AND MEAN DIFFERENCES ON WORD DISCRIMINATION FOR THREE TREATMENT GROUPS OF CHILDREN WITH A BELOW-AVERAGE READING READINESS STATUS

	$\bar{x}_j$	$\bar{x}_j - \bar{x}_C$	$\bar{x}_j - \bar{x}_B$
$\bar{x}_A$	19.59	8.04	2.2268
$\bar{x}_B$	17.3632	5.8132	
$\bar{x}_C$	11.55		